

I claim:

- 1 1. A combustion-based system, comprising:
2 a combustor for burning a combustible material, wherein an exhaust gas
3 stream output by said combustor includes NO₂ and at least one metal including
4 mercury;
5 at least one ultraviolet light source in optical communication with said exhaust
6 gas stream, ultraviolet light from said light source photo-chemically dissociating at
7 least a portion of said NO₂ to form an NO₂ reduced exhaust stream, and
8 a sorbent containing filter media for receiving said NO₂ reduced exhaust
9 stream, said filter media trapping said at least one metal.
- 1 2. The system of claim 1, wherein said system comprises a fossil fuel
2 fired power plant.
- 1 3. The system of claim 1, wherein said combustible material comprises
2 coal.
- 1 4. The system of claim 1, wherein said system comprises a waste
2 incinerator.
- 1 5. The system of claim 1, wherein said mercury in said exhaust stream is
2 in the vapor phase.
- 1 6. The system of claim 1, further comprising a particle collection device
2 for trapping said sorbent.
- 1 7. The system of claim 1, wherein said ultraviolet light source provides
2 light in a wavelength range of 350 to 400 nm.
- 1 8. The system of claim 1, wherein said system reduces an amount of NO₂
2 in said exhaust gas to below 20 parts per million.

1 9. The system of claim 1, wherein said system reduces an amount of NO₂
2 in said exhaust gas to below 10 parts per million.

1 10. The system of claim 1, wherein said system is exclusive of catalyst
2 particles.

1 11. The system of claim 1, wherein said sorbent media comprises
2 activated carbon.

1 12. The system of claim 1, wherein said light source is disposed in said
2 exhaust gas stream.

1 13. The system of claim 1, wherein said light source is disposed remote
2 from said exhaust stream.

1 14. The system of claim 13, wherein a optical fiber network transmits said
2 ultraviolet light to said exhaust stream.

1 15. A method for reducing mercury emissions from combustion-based
2 systems, comprising the steps of:
3 irradiating an exhaust gas stream including mercury and NO₂ with ultraviolet
4 light, said light photo-chemically dissociating at least a portion of said NO₂ to form an
5 NO₂ reduced gas stream, and
6 contacting said NO₂ reduced gas stream with a sorbent material, wherein
7 said sorbent traps said mercury.

1 16. The method of claim 14, wherein said ultraviolet light is in a
2 wavelength range of 350 to 400 nm.

1 17. The method of claim 14, wherein said exhaust gas stream is generated
2 by combusting coal.